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ABSTRACT

This research was conducted in order to examine whether libraries are maintaining consistent and complete subject authority control and creating syndetic reference structure for popular topics. A descriptive study of 15 private liberal arts college libraries was conducted to determine whether the Library of Congress (LC) prescribed "see" and "see also" references have been made for five different subject headings. Subject headings were selected from transaction log data of two private liberal arts college libraries. Adherence to the LC subject headings systems was determined by searching the online catalogs of 15 libraries via the Internet. The results of this study--which are consistent with similar studies--indicated that libraries are not maintaining consistent and complete subject authority control or creating syndetic reference structure. Data are discussed in terms of overall library performance and individual library performance, as well as by individual subject heading. In addition, use of scope notes and corresponding online catalog systems are discussed. Six tables and charts show library name and system used, overall performance by heading, and library scores for various see and see also references. Appendices include the established headings (150) used in the study with accompanying 360, 450, 550, and 680 fields; sample data collection instrument; examples of values defined for use of 450 and 550 headings; and example of blind lead for the heading "Home Schooling." (Contains 20 references.) (Author/AEF)

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A STUDY OF THE SUBJECT HEADINGS PRACTICES OF FIFTEEN SMALL LIBERAL ARTS COLLEGE LIBRARIES

A Master's Research Paper submitted to the
Kent State University School of Library and Information Science
in partial fulfillment of the requirements
for the degree Master of Library Science

by

Laura J. Kissel

April, 1996

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A STUDY OF THE SUBJECT HEADINGS PRACTICES OF FIFTEEN SMALL LIBERAL ARTS COLLEGE LIBRARIES

This study was designed to study the research question : *Are libraries maintaining consistent and complete subject authority control and creating syndetic reference structure for popular topics?* A descriptive study of fifteen private liberal arts college libraries was done to determine whether the LC prescribed "see" and "see also" references have been made for five different subject headings. Subject headings were selected from transaction log data of two private liberal arts college libraries. Adherence to the LC subject headings system was determined by searching the online catalogs of 15 libraries via the Internet. The results of this study are consistent with similar studies. This study found that libraries are not maintaining consistent and complete subject authority control or creating syndetic reference structure. The data are discussed in terms of overall library performance and individual library performance, as well as by individual subject heading. In addition, use of scope notes and corresponding online catalog systems are discussed.

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INTRODUCTION

Much of the current library science literature emphasizes the myriad of problems associated with subject searching in online catalogs. While most will agree that subject searching is an important feature of an online catalog, there are differences in opinions as to what constitutes the best way to achieve optimal subject access. At the forefront of this discussion is the ongoing criticism of the Library of Congress Subject Headings List (LCSH) and the subject cataloging processes in general (Bloomfield 1993, Connell 1996?, Reynolds 1989, Studwell 1993a, 1993b). Critics argue that often the terminology used by the LCSH is biased or obsolete. Others complain about the long time lag between when new fields of study emerge and when LC assigns new subject headings to describe it. It has also been pointed out that, while the LC system is in use in the majority of libraries in the country, it was originally designed only for the Library of Congress. Consequently, by using a system designed as such, libraries are incorporating its inconsistencies and problems into their own catalogs (Reynolds1989).

Subject searching itself is an interesting phenomenon in that a subject search is often an attempt to illicit information about which the patron knows very little (Larson 1991a); therefore, the online catalog needs to be designed in such a way that the patron will be assisted in this search for information. Subject authority control and syndetic structure are critical in this assistance. Subject authority control is the process of defining *one* form of heading to denote a particular subject. Syndetic structure is the underlying system of cross references which serves to lead users from terms not used in the library catalog to the *authoritative* form used ("*see*" references); or to lead users from terms used

in the catalog to other related terms in use in the catalog ("*see also*" references). Research has shown that while users do more subject searching than other kinds of searching in the online catalog, they are less successful searching subjects than known items. Because users have problems matching their search terms with those used by the system, browsing authority files becomes of major importance in conducting a successful subject search (Lewis 1987). Relationships among terms or to related terms should be clear and lead users from unused to used terminology (Dalrymple and Younger 1991). These relationships can also help a user to articulate his/her needs. Coughlin (1992, 276) states "... with online systems meticulous authority work is fast replacing other tasks as the number one priority. Good authority control work ensures that only correct records are retrieved. For this reason authority work has moved from a position of near invisibility a decade ago to one recognized as a major cataloging concern at the national level". *Correct records* in this quote refers to the concepts of recall and precision. *Recall*, as defined by Larson (1991a), is the proportion of all relevant items in the entire database that are retrieved by the search. Larson (1991a) defines *precision* as the proportion of retrieved items that the user finds to be relevant for a given search. *Relevance* is usually defined to be a subjective assessment by a given user of the value or utility of a particular item in satisfying a particular need for information (Larson 1991a). That is, for a given search, each of the documents in the database either contains information that the user wants or it does not. If it does, then it is considered relevant; otherwise, it is nonrelevant (Larson 1991a).

But are libraries actually doing this work? Connell (1996?) points out that while there is little doubt that American libraries are using the LCSH extensively, it is unclear

how extensively or consistently they use the LC subject heading system. While syndetic structure and authority control are central to the application of the LCSH system, it is questionable as to whether libraries are actually undertaking this work. In fact, Connell's study would indicate that libraries in fact are not able to provide the subject authority control and syndetic structure that makes the LCSH system work (1996?). Klugman (1989) and Palmer (1986) note that when new terminology appears, catalogers do not generally go back and change earlier headings; therefore pertinent information on certain topics may be dispersed throughout the catalog.

Several studies have examined the subject headings practices of libraries. Lancaster et al. (1991) report on a study to determine the probability that a skilled catalog user would retrieve "the best" materials in a library on some subject. Topics in this study were determined by the availability of recent, expert prepared bibliographies. Connell's forthcoming (1996?) study looks at the handling of 15 subject headings in 50 academic library catalogs, via the Internet. Headings in this study were chosen from the *Cataloging Service Bulletin*, 49-52 (Summer 1990-Spring 1991). In Palmer's 1985 study, the subject headings practices of nine libraries in Erie County, NY were examined (1986). Subject headings for this study were selected by the author on the basis of the expectation of changes that had occurred over the previous 10 years (for example, FEMINISM, WOMEN, and HOMOSEXUALITY were used). The research presented in this paper is similar in nature to the Palmer study in that popular topics are examined. It is also similar to the Connell study, in that library catalogs via the Internet are searched to determine adherence to LC subject headings practices. The goal of this research is to sample small,

private, liberal arts college libraries to note whether the results are similar to the Palmer and Connell studies.

LITERATURE REVIEW

In an article which discusses the problems inherent in subject searches (Larson 1991a), it is noted that subject searches too often fail to retrieve anything and those that do often retrieve too much material. Larson notes the major problems with subject access, specifically that users seldom succeed in formulating queries that match the terminology used in LCSH. Additionally, he points out that proposals for improving subject searching include enhancement to the subject headings, including supplementing LCSH with terms from a specialized thesauri, and exploiting the machine-readable version of the LCSH to provide expanded lead-in vocabulary. Finally, he discusses database characteristics of an experimental online catalog system using "classification clustering" to provide enhanced subject access.

Reynolds (1989) proposes a subject cataloging code as the solution to the problems with subject retrieval. She discusses the impediments to a code, which include problems such as a lack of consensus in the field about the major objectives of a subject catalog, and our inability to define subject, specificity or relevance.

Reynolds (1989) also notes that cataloging practice does not include systematic reconsideration of previous cataloging to add or change subject headings in accordance with the later evaluation of a work. In addition, she discusses the problems that exist in the current use of the LCSH, most notably the subjectivity involved in determining what constitutes the appropriate subject heading for a work. However, she does recommend

some practical steps that can be taken to improve subject searching. Among these are : improving and modifying the terminology used in LCSH; improving the cross-reference structure by evaluating the present references, eliminating inappropriate ones, and altering the structure to agree with the perceptions of practitioners in particular subject disciplines; and working toward an authority control system that recognizes equivalencies and allows different headings to be used in different libraries (Reynolds 1989).

Other studies have compared subject searching to key word searching as a means of determining search success. A study by Connell (1991) concerned with improving subject access in an online catalog suggests that one of the ways to increase subject recall is to manipulate the grammar of headings and to access parts of fields not normally accessed. She notes that if recall is the only consideration, keywords in the subject fields will produce good results. In a study at the University of Toronto Libraries in 1991, Cherry (1992) analyzed zero-hit subject searches to explore the effectiveness of various conversions of users' queries to improve recall. These conversions included : converting subject searches to keyword subject searches, converting subject searches to keyword title searches, converting subject searches to title searches, converting a subject search against the online catalog database to a search for a cross-reference in an online version of LCSH to use in a new search, and converting subject searches to truncated versions. The findings of this study show that keyword subject, keyword title or title searches using the original query from the user's zero-hit subject search were as fruitful or more fruitful that new searches constructed from cross-references provided by LCSH.

A study done by Marner (1993) contrasts with the earlier findings of Cherry. His research addresses the questions : does keyword searching provide a satisfactory substitute

for searching by the authorized heading, and what kind of service or disservice do libraries do to their users when keyword searching is the only strategy tried? Marner's study determined how many of the nonauthorized headings listed as cross references in an authority system could be found in the bibliographic record. The results of Marner's study indicated that the "use of keyword searching alone is insufficient for controlled vocabulary of the Library of Congress name and subject authority records". He notes that libraries that provide on-line authority control do so at a cost. While technical services staff and faculty spend a great deal of time and effort building the authority file, most libraries do not have the resources to teach each user the intricacies of the Library of Congress subject headings and name authorities. He further concludes that authority work and a system of cross-references (i.e., syndetic structure) are essential components of an online catalog (Marner 1993).

A study by Gerhan (1989) concurs with the findings of Marner. Gerhan reports on the findings of a study of sample records from the Union College Library, Schenectady, NY, and discusses the comparative effectiveness of the Library of Congress subject heading field and the title field (i.e. title keyword) as means of subject access to the bibliographic record. Gerhan's results indicate that choosing access through the subject heading field is overall, likely to be the more productive single-route online catalog option. In fact, his sample suggests that LC subject headings are likely to provide the more effective subject access four times as often as will title keywords. *Productivity* in Gerhan's study means that subject searchers will retrieve more citations in fewer tries. *Effective* is used to denote a search which leads the user to subject-relevant records.

Larson (1991b) reports of a study which notes a decline in subject searching frequency over a six year period in a large university library, while at the same time noting a corresponding increase in keyword searching. He suggests that a number of factors have contributed to the decline in subject searching, chiefly the user's difficulties in formulating subject queries with LCSH. He also states that no syndetic structure is currently available in most online catalogs to aid the user by providing cross-references to preferred LCSH terms. Therefore the users must either know the preferred terms or are likely to fail in their searches. Larson also presents the problem of information overload, especially in relation to the use of keyword searching, which generally increases the number of bibliographic records that will match a user's subject search. He believes that the replacement of subject searching with title keyword searching in his study indicates that users are attempting to avoid the search failure problems presented by LCSH. However, the lack of vocabulary control for title keywords places onto the user the burden of finding any synonyms to the search terms chosen. This lack also leads to the retrieval of much irrelevant material (Larson 1991b).

Many studies have noted the problems with subject searching and a variety of solutions to the problem have been proposed. However, a recurring theme in many of them involves improving the authority control and syndetic structure of our online systems. A study conducted by Van Pulis and Ludy (1988) examined subject searching in the Ohio State University's (OSU's) online catalog. The main focus of the study was the system's response to the user's search. The methodology used in this study consisted of a questionnaire distributed to users as they approached the online catalog terminals in OSU's Main Library. User's were asked if they would be searching by subject, and if so, would

they be willing to complete a brief questionnaire as they performed their searches. While Larson (1991b) states that syndetic structure is unavailable in most online catalogs, the Ohio State University Libraries added this feature to their catalog in 1984. Van Pulis and Ludy were interested in how subject searchers used this information. Their study found that users located subject search terms in the online catalog about 80 percent of the time, and 14 percent of them were found through LCSH *see* references. They state "the fact that 14 percent of catalog users' search terms matched cross-references show how well cross-references direct users to appropriate terminology". In addition, about half the terms displayed *see also* references, alerting users to related material. While users examined this structure for only 27 percent of the headings for which it was available, 42 percent of the users surveyed had examined the structure before and most considered the information useful (Van Pulis and Ludy 1988). Dalrymple and Younger (1991) see subject authority control as a central problem in academic libraries today. They propose that both authority control and "informed retrieval" are equally important for providing subject access. *Informed retrieval* is defined as using feedback from an information system in order to improve retrieval results. They note that considerable time and intellectual energy are brought to bear in the construction of a well-designed subject authority list or thesaurus. However, the expenditure of these resources is justified in the belief that controlled vocabularies, because of their classing functions, are the primary means of facilitating recall, and therefore, provide a needed service to users (Dalrymple and Younger 1991).

Overall, the literature surrounding the topic of successful subject searching seems to indicate the need to provide and maintain a subject authority file and syndetic structure in order for subject searching using the LCSH system to be successful. However, several

studies indicate that libraries are not providing this underlying structure. A study done in 1985 looked at the subject heading practices in nine libraries in Erie County, New York (Palmer 1986). Palmer selected four headings for this study on the basis of his expectations for important references and cross-references associated with the headings. This study found that only the three largest, best staffed libraries made any serious attempt at subject authority control, but that not even these libraries provided the LCSH "See Also" references that are supposed to make specific entry and syndetic structures work (Palmer 1986). Palmer points out that all of the libraries in the study used a bibliographic utility, such as OCLC (the Online Catalog Library Center), for the bulk of their cataloging, with copy cataloging involving the greatest amount of cataloging activities. He notes the tendency in libraries to accept all subject headings on the copy, with changing or eliminating headings occurring rarely. As a result, changes in LC headings resulted in a dispersion of materials, with old materials remaining under old headings, new materials placed under new headings, and cross references rarely provided (Palmer 1986). Connell's forthcoming (1996?) study builds upon Palmer's 1985 research. In a study which examined the subject headings practices of 50 academic libraries whose catalogs are available on the Internet, she found the results "disappointing". Fifteen headings were selected from the *Cataloging Service Bulletin* 49-52 and were chosen on the basis of providing a variety of subject heading changes. Only one library made all the hierarchical *see also* references (BT-NT) for the headings they used, while 28 Libraries made all the lateral *see also* references (RT-RT) for headings they used. Only 26% of the potential scope notes were made (Connell 1996?). Scope notes define the context in which a heading is used, often in relationship to another heading. In addition, it was found that

39.1% of the libraries continued to use both old and new forms of headings, presenting confusing information more than a third of the time. Connell points out that, "while subject heading system maintenance is very labor intensive and expensive to maintain, subject cataloging done poorly is very expensive indeed. Not keeping up with changes in subject headings results in users finding materials on the same subject under different headings, providing blind leads to headings not assigned, and sending users in a circular chase for information when references are provided to both old and new headings".

The study presented in this paper is an attempt to build upon the earlier findings of Palmer and Connell. Again, popular topics are examined to determine whether libraries are adhering to the LCSH system. The assumption here is that it would seem that libraries would be *more* likely to provide the underlying cross references and syndetic structure for the so-called "hot" topics, than topics of marginal or limited interest. However, this assumption has not been supported in the Palmer or Connell studies. It will be interesting to note whether this research will provide similar results.

While similarities exist between the previous two studies and this research, there are notable differences as well. For example, while the Palmer study looked at nine libraries in one particular geographic area (Erie County, PA), this study examines fifteen libraries geographically dispersed throughout the United States. Additionally, the Palmer study examined different types of libraries including small to medium college libraries, large county public libraries, and small suburban public libraries; the Connell study examined 50 academic libraries whose catalogs were available via the Internet. This research looks only at 15 small liberal arts college libraries with catalogs available via the Internet. It is of

interest to note whether the small libraries in this research perform in a similar manner as the libraries selected for study in the Palmer and Connell studies.

RESEARCH QUESTION

This research was conducted in an attempt to answer the following question:

Are libraries maintaining consistent and complete subject authority control and creating syndetic reference structure for popular topics?

For the purposes of this study, the following terms are defined as follows. *Libraries* are defined as small liberal arts college or university libraries similar in nature and size to Ohio Wesleyan University and/or Otterbein College. *Syndetic reference structure* is defined as the LCSH prescribed "see" and "see also" references as described in the LC subject authority file available on OCLC. All libraries in this study used OCLC, thus it was not necessary to determine syndetic structure using the hard copy edition of LCSH. *Popular topics* are defined as a sample of the entry-level vocabulary used by patrons in two small liberal arts college libraries, while searching in the subject index of the library's online catalog. These terms will provide the basis for this study.

METHODOLOGY

In order to answer the research question which asks *Are libraries maintaining consistent and complete subject authority control and creating syndetic reference structure for popular topics?*, a study which examines the subject headings practices in small liberal arts college libraries was conducted. Transaction logs were visually analyzed to determine entry level vocabulary to be used in the study.

Sample/Subjects and Data Collection Techniques

Five headings total were selected from the transaction log data from a two month time period of two small liberal arts college libraries (Ohio Wesleyan University and Otterbein College). The Ohio Wesleyan University log supplied a far greater number of headings; thus, four headings were selected from this log and only one heading was selected from the Otterbein College log. These headings were selected based upon their potential for providing a variety of references and cross references that could be analyzed as far as adherence to the Library of Congress subject headings system. In addition, since the aim of this study was to examine subject authority control and syndetic structure for popular topics, headings had to be used more than once to be considered. Therefore, an assumption made for this study is that users have entered some valid LCSH terms or LCSH cross references while searching in the subject index of the online catalogs being sampled. Each heading was searched in the Library of Congress subject authority file on OCLC to determine scope notes (360 and 680 fields), *see from* references (4xx fields) and

see also from references (5xx fields) used by LC. For the 5xx fields, the distinction between related terms (RT's) and broader terms (BT's) was noted. Please see Appendix A for a listing of headings used in the study. Once the headings were selected, 15 library catalogs were searched via the Internet to determine whether the LC prescribed *see* and *see also* references had been made. Information about each library's use of the five headings selected was recorded for later analysis. Please see Appendix B for a sample data collection instrument used in the recording of this information.

The criteria used to select the 15 libraries were the following : private liberal arts colleges or universities with student enrollment under 3000. I began by making a print out of libraries with catalogs available on the Internet. Using this printout, I was immediately able to eliminate many libraries that did not fit the study criteria (for example, large universities, public libraries, consortia). For those libraries remaining, I used the 48th edition of the American Library Directory, 1995-96, to determine whether they met the study criteria. For the few libraries that were not listed in the American Library Directory, I was able to discern whether they met the study criteria by using the 23rd edition of Lovejoy's College Guide, 1995. This process left me with a total of 54 private liberal arts colleges or universities, with enrollment less than 3000, that had catalogs available on the Internet. Using a random number table, I then identified 15 libraries for my sample. If I was unable to connect to the library catalog, I then moved to the next number in the table, until a total of 15 libraries had been sampled.

A limitation of this study is that the sample size of 15, based on a population of 54, is too small to be considered statistically significant. However, this study is valuable in that

it builds upon previous similar studies and serves as a starting place to look at the issues of subject authority control and syndetic structure in small, private liberal arts college libraries.

Please see the following table, which lists each of the libraries used in this study, with the corresponding online catalog system used.

Table 1: Library Name and Online System Used

LIBRARY NAME	*SYSTEM USED*
Point Loma Nazarene College, CA	INNOPAC
Wheaton College, IL	Dynix
Maharishi International University, IO	DRA
Colby College, MN	INNOPAC
Simmons College, MA	INNOPAC
Williams College, MA	INNOPAC
New Mexico Highlands, NM	DRA
Colgate University, NY	INNOPAC
Union College, NY	DRA
Guilford College, NC	DRA
Oberlin College, OH	INNOPAC
University of Tulsa, OK	DRA
Chatham College Library, PA	Galaxy
Lafayette College, PA	INNOPAC
Washington and Lee University, VA	INNOPAC

Data Analysis

Once the data were collected, results were analyzed by scoring each individual library on the appropriate and correct usage of the five headings selected. In Connell's 1996? forthcoming study, she identified a ranking system to determine levels of success in application of the LCSH system. This ranking system was adapted for use in this study. Values were assigned to the use of the 450 headings (*see* references) and the 550 headings (*see also* references). The values range from 1-5, with 1 being the best (no errors made), and 5 being the worst. Specific definitions of the values are:

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1 No errors in syndetic reference structure

2 *See* references made to related headings in catalog when 1xx heading not used.

3 Term file does not reflect headings used in catalog

A term file is a file consisting of the form of subject headings which have been used in the catalog, and/or which have been established for use.

4 Reference structure lacking; or, references made to headings not used in catalog (blind references)

5 450 and 150 headings used concurrently; or, old headings used and references from old headings to new headings made

A ranking of 4 or 5 results in a serious error in retrieval or indicates a serious error in syndetic structure, with patrons unable to find all material on the subject, even when materials may in fact exist in the catalog; or blind references to headings not used in the catalog. Please see Appendix C for examples of values assigned to 450 and 550 headings. It should also be noted here that although a value of 3 was possible, no libraries in this study ranked a 3 on their application of *see* or *see also* references.

Of additional interest was whether certain headings provided similar problems across all fifteen libraries studied. Finally, the fifteen libraries studied were ranked as to overall performance in the application of correct subject headings practices for the five headings selected.

RESULTS OF THE STUDY

Overview

The libraries in this study performed basically as expected, based upon similar previously conducted studies. Overall, libraries scored high (all 1s or 2s) on only 64% (269 out of a possible 420) of all potential *see* and *see also* references. Libraries scored high (1 or 2) on only 61% (174 out of a possible 285) of the prescribed *see* references . *See also* references faired slightly better for hierarchical references (broader terms [BT] to narrower terms [NT]), with 67% (60 out of a possible 90) receiving a score of 1 or 2. Surprisingly, lateral *see also* references (between related terms [RT]) faired much better, with 78% (35 out of a possible 45) scoring high. Stated another way, 39% of the *see* references examined in this study may not be made at all; and/or they may lead patrons to headings not used in the catalog (blind references); and/or they may be used concurrently in the catalog with the prescribed headings. Additionally, 22% of the lateral *see also* linkages have not been made, and 33% of hierarchical *see also* linkages have not been made. This means users are missing much potentially relevant material. As stated previously by Connell (1996?), libraries continue to present confusing information to their patrons more than a third of the time.

Detail : Library Performance

Only one library in this study scored high overall (all 1s or 2s) in its application of all the 28 potential *see* and *see also* references. Eight libraries scored 1 or 2 on between

50% and 99% of the potential *see* and *see also* references, five libraries scored 1 or 2 on between 20% to 49% of all potential references, and one library scored 1s or 2s on less than 20% of all potential *see* and *see also* references.

Only one of the fifteen libraries studied scored high (1s or 2s) on their application of all 19 of the LCSH prescribed *see* references for the five headings under study. Five of the fifteen libraries scored high (all 1s or 2s) for all three of the potential lateral *see also* references [RT]. These same five libraries plus one additional library scored high (1 or 2) for all of the 6 potential hierarchical *see also* references [BT].

Looking at the data, there seems to be a trend in that libraries who seem to apply the headings properly did so for all five headings under study. In other words, libraries tended to do a good job overall, or a mediocre or poor job overall. For example, one library scored 1 or 2 on 21% of the *see* references it applied, 33% on the lateral *see also* references [RT] applied, and 50% on the hierarchical *see also* references [BT] it applied. In another example, one library scored 1 or 2 on 58% of the *see* references it applied, 67% on the lateral *see also* references [RT] it applied, and 83% on the hierarchical *see also* references [BT] it applied. Please see the following charts for a graphic display of this data. To ensure the anonymity of the libraries in this study, "Library Number" in these charts represents a random assignment of numbers 1 through 15, with each number representing a particular library in the sample. Thus, if one wanted to compare scores across charts, Library Number 1 is the same library in all of the four following charts.

CHART 1: Library scores for total *see and see also* references

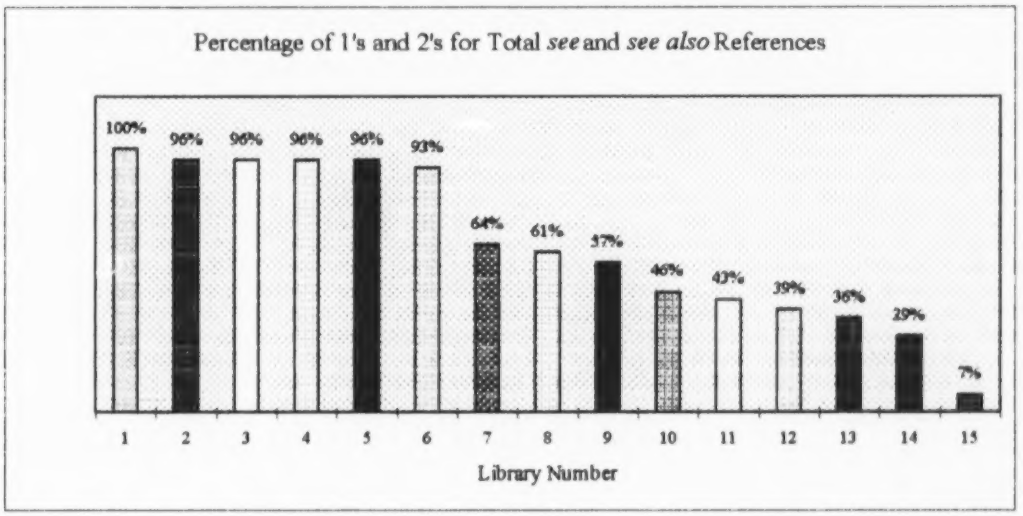

CHART 2: Library scores for *see* references

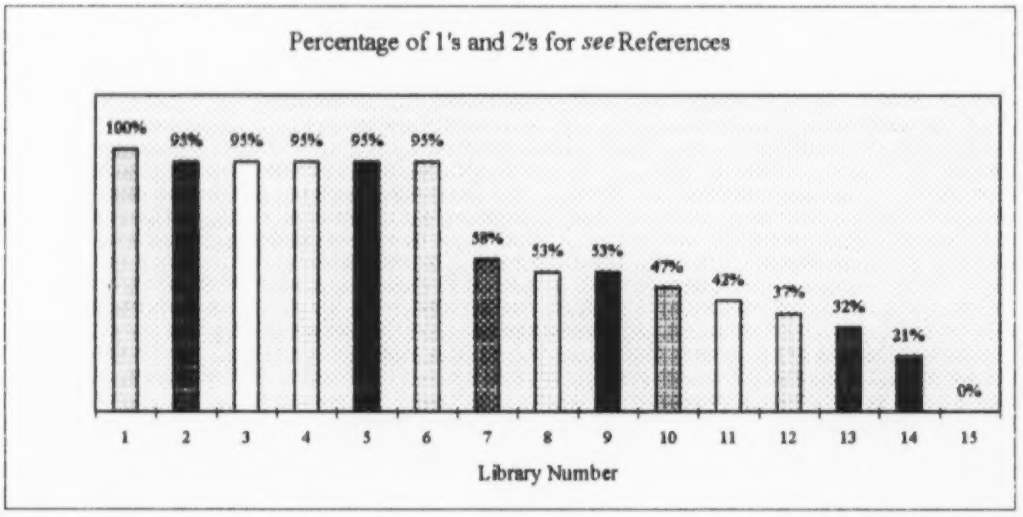

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CHART 3: Library scores for lateral *see also* references

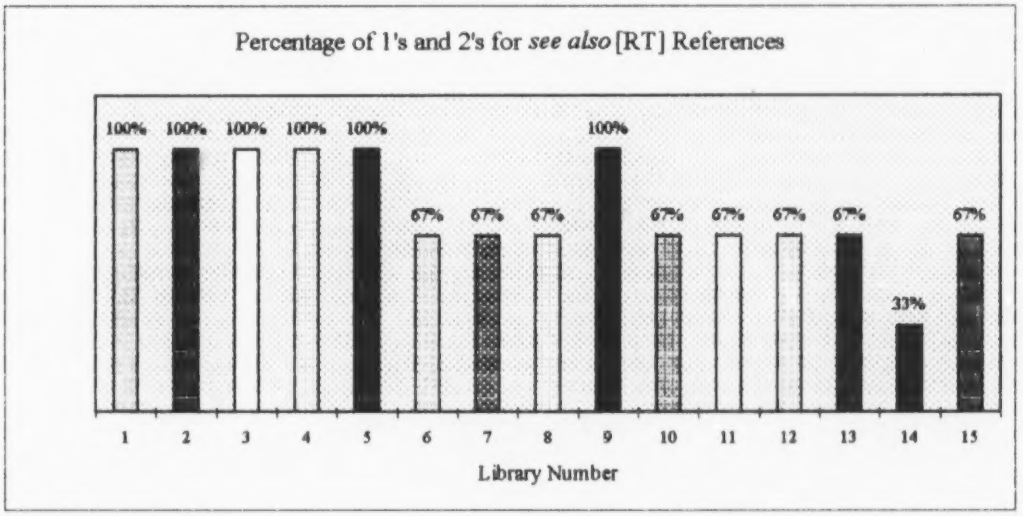
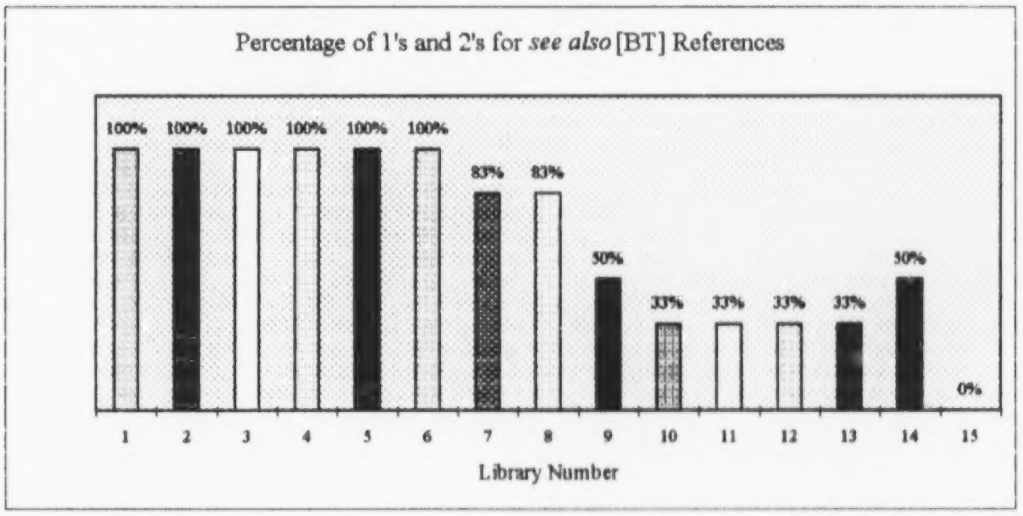


CHART 4: Library scores for hierarchical *see also* references



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Detail : Performance by Heading

The following table summarizes library performance by heading.

Table 2 : Overall performance, by heading

TOTAL = the number of potential occurrences of a given reference[1]
VALUE 1 OR 2 *or* VALUE 4 OR 5 = the number of occurrences scoring high (1 or 2) *or* low (4 or 5) for a given reference[2]

HEADING	VALUE 1 OR 2	TOTAL	PERCENTAGE	VALUE 4 OR 5	TOTAL	PERCENTAGE
Afro-Americans						
450s	53	75	71%	22	75	29%
550s [RT]	25	30	83%	5	30	37%
550s [BT]	12	15	80%	3	15	20%
Total	90	120	75%	30	120	25%
Gun Control						
450s	33	45	73%	12	45	27%
550s [BT]	11	15	73%	4	15	27%
Total	44	60	73%	16	60	27%
Gays						
450s	35	45	78%	10	45	22%
550s [BT]	11	15	73%	4	15	27%
Total	46	60	77%	14	60	23%
Home Schooling						
450s	53	120	44%	67	120	56%
550s [RT]	10	15	67%	5	15	33%
550s [BT]	6	15	40%	9	15	60%
Total	69	150	46%	81	150	54%
Women in Advertising						
550s [BT]	20	30	67%	10	30	33%
Total	20	30	67%	10	30	33%
All Headings						
450s	174	285	61%	111	285	39%
550s [RT]	35	45	78%	10	45	22%
550s [BT]	60	90	67%	30	90	33%
Total	269	420	64%	153	420	36%

[1] Example : for the heading Afro-Americans, 5 prescribed 450 references times 15 libraries yields a total of 75 potential occurrences. For a complete list of all prescribed 450 and 550 references, please see Appendix A.

[2] Example : for the heading Afro-Americans, there were 53 high scores (1 or 2) and 22 low scores (4 or 5) for the prescribed 450 references.

In analyzing the data it became clear that libraries in this study had difficulty with one heading in particular, **HOME SCHOOLING**. This heading had a total of eight *see* references and two *see also* references prescribed by LC. Overall, libraries scored 1 or 2 for only 46% of the applicable *see* and *see also* references made. This means that more than half of the information presented on this heading by the fifteen libraries under study is faulty and/or incomplete! Of the 120 potential *see* references that could be made for this heading, only 53 scored either a 1 or 2. Ten of the 15 potential lateral *see also* [RT] references were scored 1 or 2, and only 6 of the 15 potential hierarchical *see also* [BT] references scored 1 or 2. This heading presented a severe problem for two libraries in particular, in that the heading **HOME SCHOOLING** was not assigned to any materials in their catalog, yet, upon searching the 450 references in the catalog, a message led the patron back to **HOME SCHOOLING**. For example, a subject search of the reference **Home-based education** results in the following message : "**Home-based education** is not used in this library's catalog; **Home Schooling** is used instead. Do you wish to search for **Home Schooling**? (y/n)". Answering yes to this question leads the user back to the screen with an alphabetical display of subjects, with no entries for **HOME SCHOOLING**. Please see Appendix D for an illustration of type of problem. Another problem which resulted in low scores for the heading **HOME SCHOOLING** was the fact that an additional four libraries failed to make any *see* or *see also* references at all, even though they had materials in their catalog assigned to the heading. Three more libraries actually make some *see* references, but to the heading **DOMESTIC EDUCATION**, rather than **HOME SCHOOLING**. Unfortunately, none of these three libraries have provided the

scope note for **HOME SCHOOLING**, which provides clarification for these terms. It states: "Here are entered works on the provision of compulsory education in the home by parents as an alternative to traditional public or private schooling. General works on the provision of education in the home by educational personnel are entered under **Domestic education**." In effect, then, what these libraries have done is lead users *away* from potentially useful information that is entered under **HOME SCHOOLING**.

Five of the fifteen libraries sampled scored low (all 4s or 5s) on their application of *see also* references for this heading. Two of the five libraries provided blind leads from the 550 headings back to the heading, **HOME SCHOOLING**, which was not in use in their catalog. (These are the same two libraries which provided blind leads from the 450 fields.) Other problems include the use of the 550 heading in the catalog, without the corresponding reference to the heading **HOME SCHOOLING**. Surprisingly, libraries did a better job in making the linkages between the lateral *see also* reference [RT], with 67% scoring 1s or 2s, while only 40% scored 1s or 2s for the hierarchical *see also* reference [BT].

The heading **WOMEN IN ADVERTISING**, while one of the simplest, in terms of the number of references prescribed by LC, resulted in an overall score of 67%. No *see* headings were prescribed and only two hierarchical *see also* references were prescribed. However, libraries scored 1s or 2s on only 20 of the 30 potential *see also* references. The remaining 10 references all received a score of 4, meaning these libraries simply did not make the linkage from the two broader headings to the more specific heading, **WOMEN IN ADVERTISING**, which was in use in their catalogs.

The heading **GUN CONTROL** provided libraries with the same types of problems that **WOMEN IN ADVERTISING** did. While this heading was slightly more complex, with three prescribed *see* references and one prescribed hierarchical *see also* reference, libraries scored slightly better, scoring 1s or 2s for 73% of their application of *see* and *see also* references. While 11 of the 15 libraries sampled scored all 1s or 2s, the remaining four libraries scored all 4s in their application of *see* and *see also* references. Again, these four libraries simply did not provide any references from either the 450 or 550 headings back to the heading **GUN CONTROL.**

While the heading **AFRO-AMERICANS** was second in complexity only to **HOME SCHOOLING**, with 5 prescribed *see* references and 3 prescribed *see also* references, libraries scored 1s or 2s for 75% of the prescribed references. Libraries scored 1 or 2 for 71% (53 out of a possible 75) of the prescribed *see* references. Nine of the fifteen libraries scored high (all 1s or 2s) for their application of the prescribed *see also* references made for this heading. However, this heading did display a variety of problems. Libraries seemed to have trouble making all of the prescribed references, with only two libraries scoring 1s or 2s on their application of all 450 and 550 references. This heading displayed a high incidence of libraries using a 550 heading concurrently with the 150 heading, and no linkage between them.

A serious error made in this heading was the incidence of libraries making the correct *see* reference from the heading **Afro-Americans =z United States**, but then entering materials under that heading anyway. The scope note for **AFRO-AMERICANS** is useful, as it states : "Here are entered works on citizens of the United States of black

African descent...". Unfortunately, none of these libraries provided the scope note, which helps to clarify use of the heading. This results in materials on the same subject dispersed throughout the catalog under multiple headings. Seven of the fifteen libraries sampled made this error on this particular 450 reference.

Libraries seemed to do a better job in applying the correct *see also* references for this heading, particularly the lateral [RT] references. 25 out of a possible 30 (83%) references scored 1 or 2 on their application of lateral *see also* references, while 12 out of a possible 15 (80%) scored 1 or 2 on their application of hierarchical *see also* [BT] references. The most common error resulting in low scores were libraries assigning the 550 heading without making the corresponding linkage to the related or narrower heading in use in their catalogs.

The heading **GAYS** scored best overall, with 44 of the 60 (77%) potential *see* and *see also* references receiving high scores (1 or 2). This heading was relatively uncomplicated, in terms of LC prescribed references, particularly in comparison to **HOME SCHOOLING** or **AFRO-AMERICANS**. LC prescribes three *see* references and one hierarchical *see also* reference for this heading. Eleven of the 15 libraries sampled scored high (all 1s or 2s) on their application of the *see* and *see also* references. However, the four remaining libraries had problems making the correct references. Particularly problematic seemed to be the *see* reference for **homosexuals**. Three of the four libraries are using this heading concurrently in their catalogs with the correct heading **GAYS**. This results in materials on the same subject dispersed throughout the catalog under different headings. These same three libraries made no reference from the broader term

PERSONS to the narrower term GAYS. The fourth library simply made no 450 or 550 references at all. For these libraries, this results in the user's inability to locate all potentially relevant materials in the catalog, despite the fact that users have entered valid subject search data in to the catalog.

Detail : Use of Scope Notes

All five of the headings used for this study had either a complex *see also* reference (360 field) or a general note (680 field) in the LC authority record. One heading, AFRO-AMERICANS displayed both types of notes. Libraries in this study made 49% of all potential scope notes (44 out of 90). Only one library made all six of the scope notes for the five headings under study. Three libraries made no scope notes at all. It should be noted here that no INNOPAC libraries made any 360 scope notes, but made all but three of the potential 680 scope notes. However, the INNOPAC display for this note is complicated. For example, searching the heading HOME SCHOOLING does not provide access to the scope note. One only gains access to the scope note through a search of one of the 550 headings. A search of the heading EDUCATION PARENT PARTICIPATION results correctly in a note stating "*see also* HOME SCHOOLING". Selection of this line number then results in a display stating "HOME SCHOOLING is related to EDUCATION PARENT PARTICIPATION. Do you wish to search for HOME SCHOOLING? (y/n/i) (i for INFO on what this topic covers)". Keying "i" will then display the scope note for HOME SCHOOLING. This display occurred even for the two libraries that had no materials assigned to the heading HOME SCHOOLING in

their catalogs. Thus, even though no materials were entered under this heading, one could still view the scope note for it!

This complex display mechanism is true for all 680 scope notes used by the INNOPAC libraries. I feel this display is unnecessarily complicated. While it is helpful to display the scope note in conjunction with the 550 headings, it should also be displayed with a search of the 150 heading. Therefore, while INNOPAC libraries did include the majority of 680 scope notes for the five headings under study, I wonder how helpful they actually are, considering how complicated it is to retrieve them. Please see Appendix E for an example of an INNOPAC display of a scope note.

Detail : Performance by System

A variety of online catalogs were represented by the libraries in this study. Eight libraries used INNOPAC, five used DRA, one used Galaxy, and one used Dynix. For purposes of comparison, in the following discussion the Galaxy and Dynix libraries are grouped together under the category "other". In an analysis of the data by system, it becomes quickly evident that the INNOPAC libraries far out-performed the other libraries in the study. Overall, INNOPAC libraries scored high (all 1s and 2s) for 79% of the potential *see* and *see also* references. The DRA libraries scored high (all 1s and 2s) for only 56% of the potential *see* and *see also* references, and the "other" libraries scored 1s and 2s for only 23% of the potential *see* and *see also* references. Breaking down these results into separate figures for *see* and *see also* references provides similar results. INNOPAC libraries scored high (1s and 2s) for 78% of the potential *see* references, 83%

of the potential lateral *see also* references, and 81% of the potential hierarchical *see also* references. DRA libraries scored high (1s and 2s) for 52% of the potential *see* references, 73% of the potential lateral *see also* references, and 63% of the potential hierarchical *see also* references. The "other" libraries scored high for only 18% of the potential *see* references, 67% of the potential lateral *see also* references, and 17% of the potential hierarchical *see also* references.

While the INNOPAC libraries out-performed the other libraries across the board, it should be noted that ranking high on 79% of *see* and *see also* references still means that either no references were made, blind references were made, and/or incorrect headings are in use concurrently with correct headings for 1 out of 5 references in the INNOPAC libraries in this study. Far worse, of course, is the fact that DRA libraries are presenting confusing or misleading information almost half of the time; and the "other" libraries are presenting confusing or misleading information almost 80% of the time.

As previously noted, only 49% of all potential scope notes were made. INNOPAC libraries provided scope notes 60% of the time and DRA libraries provided them 50% of the time. Neither the Dynix or Galaxy libraries provided any scope notes at all. However, it should again be noted here that the INNOPAC display for scope notes is confusing and unnecessarily complex. Keeping this in mind, one has to wonder whether providing scope notes in this manner is particularly helpful.

SUMMARY & CONCLUSIONS

This study was conducted in an attempt to determine whether libraries are maintaining consistent and complete subject authority control and creating syndetic reference structure for popular topics. Unfortunately, the results of this study are similar to that of similar studies which have been conducted by Palmer (1986) and Connell (1996?). As a group, the 15 small, private liberal arts college libraries which were analyzed on five headings for this study, did not perform well. The assumption that "hot" topics may be done correctly over topics of marginal or limited interest was not supported by this research.

To summarize, libraries in this study scored high (all 1s or 2s) overall on only 64% (269 out of a possible 420) of all potential *see* and *see also* references. Only one out of the fifteen libraries studied scored high (all 1s or 2s) in its application of all 28 potential *see* and *see also* references. One heading, **HOME SCHOOLING**, provided particular problems for libraries, with libraries scoring 1 or 2 for only 46% of the applicable *see* and *see also* references made. The heading **GAYS** scored best overall with 44 of the 60 (77%) potential *see* and *see also* references receiving high scores (all 1s or 2s). Libraries in this study made 49% of all potential scope notes (44 out of 90). However, the complex display mechanism for INNOPAC scope notes artificially inflates this figure. In comparing library results by system, INNOPAC libraries performed best, scoring high (all 1s or 2s) for 79% of the potential *see* and *see also* references.

These results indicate that libraries are not consistently maintaining complete subject authority control or creating syndetic reference structure. Consequently, users are

faced with online catalogs that present confusing and/or misleading information more than a third of the time.

As more and more libraries continue to automate and offer their catalogs on the Internet, more of these types of studies can be conducted to determine whether these results are typical.

In the meantime, libraries need to evaluate the importance of providing good subject authority work. As library budgets continue to shrink, those in decision making roles need to be made aware of the implications of poor subject authority work. Van Pulis and Ludy's study (1988) indicates that users do find syndetic structures to be useful. I believe further study examining the value of subject authority control and syndetic structure would be beneficial. Blind leads to subject headings not used, concurrent use of old and new headings in the catalog, and/or no syndetic reference structure at all results in misinformation and, one would assume, frustration for the user. If proper authority practices will assist users in locating relevant materials in the catalog, the costs of providing this control need to be weighed against the costs of not providing it.

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APPENDIX A

Established Headings (150) Used in Study with accompanying 360, 450, 550, and 680 fields

150 **AFRO-AMERICANS**

360 ǂi subdivision ǂa Afro-Americans ǂunder names of Wars, e.g. ǂa World War, 1939-1945--Afro-Americans; ǂi and headings beginning with a Afro-American

450 African Americans
450 Afro-Americans ǂz United States
450 Black Americans
450 Colored people (United States)
450 Negroes

550 AFRICANS ǂz UNITED STATES [RT]
550 BLACKS ǂz UNITED STATES [RT]
550 ETHNOLOGY ǂz UNITED STATES [BT]

680 Here are entered works on citizens of the United States of black African descent. Works on blacks who temporarily reside in the United States, such as aliens, students from abroad, etc. are entered under Blacks--United States. Works on blacks outside the United States are entered under Blacks--[place].

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150 **GUN CONTROL**

450 Control of guns
450 Firearms control
450 Handgun control

550 FIREARMS [BT]

680 Here are entered general and non-legal works on the control of guns. Works on the legal aspects of gun control are entered under Firearms--law and legislation.

---

150 **GAYS**

360 ǂi subdivision ǂa Gays ǂi under names of individual military services, e.g. ǂa United States--Armed forces--Gays

450 Gay people
450 Gay persons
450 Homosexuals

550 PERSONS [BT]

150 **HOME SCHOOLING**

450 Education, Home
450 Home-based education
450 Home education
450 Home instruction
450 Home teaching by parents
450 Homeschooling
450 Instruction, Home
450 Schooling, Home

550 EDUCATION [BT]
550 EDUCATION ~~+~~x PARENT PARTICIPATION [RT]

680 Here are entered works on the provision of compulsory education in the home by parents as an alternative to traditional public or private schooling. General works on the provision of education in the home by educational personnel are entered under Domestic education.

---

150 **WOMEN IN ADVERTISING**

550 ADVERTISING [BT]
550 WOMEN IN POPULAR CULTURE [BT]

680 Here are entered works discussing the portrayal of women in advertising. Works discussing all aspects of women's involvement in advertising are entered under Women in the advertising industry.

APPENDIX B

SAMPLE DATA COLLECTION INSTRUMENT

LIBRARY NAME:

NAME OF ONLINE CATALOG:

		ASSIGNED		REF.MADE	
1XX	**ESTABLISHED HEADING**	**Y**	**N**		
360	**SCOPE NOTES (If used)**	**Y**	**N**		
4XX	**See from reference(s)**	**Y**	**N**	**Y**	**N**
5XX	**See reference(s) (BT or RT)**	**Y**	**N**	**Y**	**N**
680	**SCOPE NOTES (If used)**	**Y**	**N**		

EXAMPLE:

LIBRARY NAME: Ohio Wesleyan University Library

NAME OF ONLINE CATALOG: INNOPAC

		ASSIGNED		REF.MADE	
150	**AFRO-AMERICANS**	**Y**	**N**		
360	ǂi subdivision ǂa Afro-Americans ǂunder names of Wars, e.g. ǂa World War, 1939-1945--Afro-Americans; ǂi and headings beginning with a Afro-American	**Y**	**N**		
450	African Americans	**Y**	**N**	**Y**	**N**
450	Afro-Americans ǂz United States	**Y**	**N**	**Y**	**N**
450	Black Americans	**Y**	**N**	**Y**	**N**
450	Colored people (United States)	**Y**	**N**	**Y**	**N**
450	Negroes	**Y**	**N**	**Y**	**N**
550	AFRICANS ǂz UNITED STATES (RT)	**Y**	**N**	**Y**	**N**
550	BLACKS ǂz UNITED STATES (RT)	**Y**	**N**	**Y**	**N**
550	ETHNOLOGY ǂz UNITED STATES (BT)	**Y**	**N**	**Y**	**N**
680	Here are entered works on citizens of the United States of black African descent. Works on blacks who temporarily reside in the United States, such as aliens, students from abroad, etc. are entered under Blacks--United States. Works on blacks outside the United States are entered under Blacks--[place].	**Y**	**N**		

DATA COLLECTION INSTRUMENT
DESCRIPTION OF HOW IT WAS USED

The five subject headings selected for use in the study were keyed into the chart as designed. Each heading sheet was then duplicated 15 times, in order to record heading information for each of the fifteen libraries under study.

The established heading (1xx), *see from* (4xx) and *see* (5xx) references were searched in each library's online catalog. Using the data collection instrument, Y or N was circled for each category as appropriate. Additionally, for the 5xx fields, BT or RT was indicated.

Therefore, a total of 75 of these subject heading data collection sheets were completed (5 headings times 15 libraries). Once this was accomplished, it was possible to evaluate each library on each heading and to compare the results.

APPENDIX C

Examples of Values Defined for Use of 450 and 550 Headings

Examples of Values for *See from* Headings (450 fields)

150 Assigned	150 in term file	450 assigned	450 ref.made	Value
Y	Y	N	Y	1
N	Y	Y	N	2
N	Y	Y	Y	3
Y	Y	N	N	4
Y	Y	Y	N	5

Examples of Values for *See also* Headings (550)

150 Assigned	150 in term file	550 assigned	550 ref.made	Value
Y	Y	Y	Y	1
N	N	Y	Y[3]	2
Y	N	Y	Y	3
Y	Y	Y	N	4
Y	Y	Y	Y[4]	5

[3] Reference made to form used
[4] Reference also made to older form

APPENDIX D

Example of blind lead for the heading HOME SCHOOLING

You searched for the SUBJECT : **home based education** Williams College

Home Based Education is not used in this library's catalog;

Home Schooling is used instead.

Do you wish to search for **Home Schooling**? (y/n)

You searched for the SUBJECT: **home schooling** Williams College

Your SUBJECT not found, Nearby SUBJECTS are:

1 Home Range Congresses..... 1 entry

2 Home Rule District of Columbia ....1 entry

3 Home Rule Ireland ....15 entry

4 Home Rule Scotland..... 1 entry

Your entry Home Schooling would be here

5 Home Social Aspects.....1 entry

6 Home Teaching by Parents -- ⇒ See **HOME SCHOOLING** .....1 entry

7 Home Video Systems -- ⇒ See also **VIDEO TAPES** .....1 entry

8 Home Video Systems Industry United States Directories.....1

APPENDIX E

Example of INNOPAC display of Scope Notes

You searched for the SUBJECT : **africans united states** W&L
CATALOG

The SUBJECT: **Afro-Americans** is related to **Africans United States**

Do you wish to search for **Afro-Americans**? (y/n/i)
(i for INFO on what this topic covers)

Information on **Afro-Americans**

Here are entered works on citizens of the United States of black African descent. Works on blacks who temporarily reside in the United States, such as aliens, students from abroad, etc., are entered under **Blacks--United States**. Works on blacks outside the United States are entered under **Blacks--[place]**.